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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO CARBONIZING WITH SULPHURIC ACID

(First Revision)

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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO CARBONIZING WITH SULPHURIC ACID

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 31 August 1988, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1956 and has been revised to align it with ISO 105/X-1984 Textiles — Tests for colour fastness X02-Colour fastness to carbonizing: Sulphuric acid, issued by the International Organization for Standardization (ISO) and also to incorporate changes in line with other standards on colour fastness tests.

0.3 Colour fastness of textile materials is of considerable importance to the consumer. The fastness depends not only upon the nature and depth of shade of the dyestuff used but also upon the nature of the fibre and the method of dyeing or printing employed; the same colouring matter, when used in dyeing or printing different fibres or when applied by different methods upon the same fibre, may give vastly different results. Formulation of standard methods of test for determining colour fastness of textile materials to different agencies likely to effect change in colour is, therefore, necessary.

1. SCOPE

1.1 This standard prescribes a method for the determination of colour fastness of textile materials of all kinds and in all forms to the manufacturing operation designed to remove vegetable impurities by a treatment with sulphuric acid at high temperatures.

1.1.1 The method is mainly applicable to wool and textile materials containing wool.

2. PRINCIPLE

2.1 A specimen containing sulphuric acid solution is dried, baked, rinsed and neutralized. The changes in colour after rinsing, neutralizing and drying are assessed with grey scale.

3. SAMPLING

3.1 Sample to determine conformity of a lot of coloured textile material to a specification shall be selected so as to be representative of the lot.

3.2 Sample drawn in compliance with the relevant material specification or as agreed to between the buyer and the seller to evaluate colour fastness of the material in the lot shall be representative of the lot.

4. PREPARATION OF TEST SPECIMEN

4.1 If the textile to be tested is fabric, draw a 10 × 4 cm specimen from the sample.

4.2 If the textile to be tested is yarn, knit or weave some of the sample into fabric and draw from it a 10 × 4 cm specimen; alternatively, prepare a specimen in the form of a wick of parallel lengths of yarn 10 cm long and about 0·5 cm in diameter tied near both ends.

4.3 If the textile to be tested is loose fibre, comb and compress enough of the sample into the form of a sheet and draw from it a 10 × 4 cm specimen.

5. TEST CONTROL

5.1 A dyeing of CI Mordant Red 3 (Colour Index, 3rd edition) treated with potassium dichromate shall be used as test control to ensure that the test is carried out correctly.

NOTE — For preparation of the dyeings, *see* Appendix A.

6. APPARATUS

6.1 Oven — capable of being maintained at 60 ± 2°C for drying and at 105 ± 2°C for baking.

7. REAGENTS

7.0 Quality of Reagents — Unless otherwise specified, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070-1977*) shall be used where the use of water as a reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

7.1 Sulphuric Acid Solution — containing 50 g of concentrated sulphuric acid (sp gr 1·84) per litre.

7.2 Sodium Carbonate Solution — containing 2 g of anhydrous sodium carbonate per litre.

8. PROCEDURE

8.1 Immerse the specimen (*see also* **8.1.1**) in sulphuric acid solution for 15 minutes at room temperature at liquor ratio of 1 : 20. Squeeze it to leave 80 percent of its mass of solution. Dry the specimen by hanging it in the oven for 30 minutes or longer, if necessary, at 60 ± 2°C. Then bake it by heating in the oven for 15 minutes at 105 ± 2°C. Remove the specimen, rinse it for 5 minutes in cold running tap water and then divide it into two equal parts. Dry one half in air in shade at a temperature not exceeding 60°C. Agitate the other half in sodium carbonate solution for 30 minutes at room temperature using liquor ratio of 1 : 40, then rinse it for 5 minutes in cold running tap water and dry it in air in shade at a temperature not exceeding 60°C.

8.1.1 Treat the test control in the manner prescribed in **8.1** in parallel but in a separate bath.

8.2 Evaluate the change in colour of the unneutralized test control by the method prescribed in IS : 768-1982* (*see* Notes 1 and 2 under **8.2.1**).

8.2.1 The numerical rating for change in colour of the treated test should be 2, yellower. If the test-control does not yield this value, then repeat the whole test (*see* **8.1** and **8.1.1**) using a fresh specimen and a fresh test-control.

NOTE 1 — Treated test specimen or the test-control should have cooled after drying and should have regained their normal moisture content before evaluation.

NOTE 2 — In cases of doubt in the colour fastness rating as assessed by an observer, the assessment should be done by at least three observers and the overall average rating should be reported.

8.3 Evaluate the change in colour of each half of the treated test specimen by the method prescribed in IS : 768-1982* (*see* Notes 1 and 2 under **8.2.1**).

9. REPORT

9.1 Report the numerical ratings for change in colour for both the rinsed and the neutralized portions of the specimen.

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*Specification for water for general laboratory use (*second revision*).

*Method for evaluating change in colour (*first revision*).

APPENDIX A

(*Clause* 5.1)

PREPARATION OF DYEING

A-1. Wet out well a sufficiently large sized woollen cloth and enter it at 40°C into a dye bath containing 1 percent of CI Mordant Red 3 Powder (Colour Index, 3rd edition), 10 percent sodium sulphate crystals ($Na_2SO_4.10H_2O$) and 3 percent acetic acid (300 g/l) all percentages being calculated on the mass of the piece and using liquor ratio of 1 : 40.

A-2. Raise the dye bath to boil in 30 minutes and continue further for a period of 30 minutes. Exhaust the dye bath, if necessary, by adding carefully 1 to 3 percent acetic acid (300 g/l) or 1 percent sulphuric acid (sp gr 1·84) well diluted with water. Boil the bath for a further period of 15 minutes after addition of acid. Cool the dye bath by addition of cold water and add 0·5 percent potassium dichromate dissolved in water. Raise the dye bath to the boil and continue for 30 minutes.

A-3. Remove the piece, rinse it in cold running tap water and dry.

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